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Roll No.									

IET, Dr. Shakuntala Misra National Rehabilitation University, Lucknow,

Department of Applied Science

Sessional Test – 1

Sem & Year: 2nd Sem & 1st Year **Session: 2023-24**

Subject: Engineering Physics **Code: Bas 201**

Duration: 90 Minutes **Max. Marks: 20**

Part A

Attempt all questions **(4×1=4 Marks)**

1. As the speed of a particle approaches the speed of light, the momentum of the particle

   a) Increases b) Decreases

   c) Remains the same (d) Approaches to zero

2. What happens to the kinetic energy of a speedy proton when its relativistic mass doubles?

   a) It doubles b) It more than double

   c) It less than doubled d) Remains unchanged

3. The mass (m) of two particles X and Y are such that $m_X > m_Y$. If both the particles have the same de-Broglie wavelength, then

   a) Their energies are not same b) Their velocities are same

   c) Their momentum are same d) X has less energy than Y

4. which of the following is not the Maxwell equation for EM wave?

   a) $div\ \vec{D} = \rho$ b) $div\ \vec{B} = -\mu_0 \vec{J}$

   c) curl $\vec{E} = -\frac{\partial \vec{B}}{\partial t}$ d) curl $\vec{H} = \vec{J} + \frac{\partial \vec{D}}{\partial t}$

Part B

Attempt any two Questions **(2 x 3=6Marks)**

5. Show that the time dilation effect is a real effect.

6. Give Heisenberg uncertainty relation. Using the Heisenberg Uncertainty relation Find the radius of first Bohr's orbit.

7. State and prove the Pointing Theorem.

Part C

Attempt any two Questions **(2 x 5=10Marks)**

8. State and prove Einstein's Mass-Energy equivalence relation. Give any two experimental evidence that verify Einstein's Mass-Energy Equivalence relation.

9. Give Physical Significance of wave function ψ. Prove Schrödinger time-dependent wave equation.

10. Give the concept of displacement current. Show that EM waves in free space move with the speed of light.